

OHIO'S HERBARIA AND THE OHIO FLORA PROJECT¹

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ABSTRACT. The Ohio Flora Project, under the direction of the Ohio Flora Committee of The Ohio Academy of Science, was actuated in 1950. The goal of the project is the production of an illustrated "Ohio Flora" covering all vascular plants, native and naturalized, with keys for their identification and a county dot distribution map for each species.

More than 300,000 specimens of Ohio vascular plants are housed in the state's several herbaria. These specimens provide the main source of data for the project. They have also provided the main data source for lists of endangered species in the Ohio flora, compiled recently by the Ohio Biological Survey and the Natural Heritage Program of the Ohio Department of Natural Resources.

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INTRODUCTION

"For a taxonomic work, herbarium specimens are the only acceptable records of the occurrence of species." E. Lucy Braun in *The Woody Plants of Ohio* (1961, p. 2).

In July 1950, interest in floristics was heightened throughout northeastern United States by the appearance of the 8th edition of *Gray's Manual of Botany*, written by Merritt Lyndon Fernald of Harvard University. The previous (7th) edition was published in 1908 and had become outdated in many regards. During the 42-year interval between the two editions, field work in the *Gray's Manual* range had greatly increased basic floristic knowledge of the area. Revisionary work had produced improved taxonomic treatments of many genera. Perhaps most important, the first truly international agreement on rules of botanical nomenclature (achieved in the 1930s) had paved the way for greater stability in scientific names of plant species.

Reviews of the new *Gray's Manual* were favorable. In *Castanea*, Core (1950) wrote,

"It is safe to say that no one botanical book has ever been awaited with such eagerness by so many people. But it was worth waiting for! . . . Few works, other than Webster's Dictionary, have through most of the years of our country's history, been subjected to as much careful study and revision, and this reviewer is of the opinion that the present [eighth] Edition has been the result of the most painstaking investigation of any in the long series."

In *Rhodora*, Bean (1950) wrote, "Forty-two years is a long time in the light of the rapid strides which all branches of botanical science have made in recent years and when botanists realized that the new edition was really on the way, it seemed that it would never actually materialize. Now that the book is before them, their long period of waiting has been richly rewarded."

In *Science*, Bartlett (1950) wrote, ". . . it is a highly satisfactory and noble achievement, the culmination of a life-time devoted to the reinterpretation of our flora. . . . His book will be a lasting landmark in the botanical history of our region, and it is a source of deep satisfaction . . . that he lived to see it in print." Fernald died in September 1950, two months after the publication of his masterwork.

The book's effect was also felt in Ohio. As Braun (1961) later recalled, "Soon after

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the publication of the eighth edition of *Gray's Manual of Botany*, by Fernald, a group of Ohio botanists, who were taking part in a field trip, conceived the idea of preparing an Ohio Flora, which would bring the nomenclature up-to-date and show, by means of maps, the distribution of Ohio's vascular plants."

A report by Herrick et al. (1955) continues the story. "At a meeting of the Executive Committee of the Council of the Ohio Academy of Science in December, 1950, it was agreed that the preparation of an "Ohio Flora" would be a significant contribution to Ohio science and a worthy project for the Academy to sponsor. A committee [consisting of E. Lucy Braun, Chairman, Glenn W. Blaydes, J. Arthur Herrick, Edward S. Thomas, and John N. Wolfe] was appointed and began functioning in March, 1951. . . . As is now planned, the "Flora of Ohio" will contain all vascular plants, native and naturalized, known to occur in Ohio. It will contain keys, diagnostic and habitat notes and distribution maps (by counties) for all species."

Braun, then professor emerita of the University of Cincinnati, had retired from faculty duties in 1948 at the age of 59 (Stuckey 1973). The year 1950 was also a signal one in Braun's career, for during this year her major work, *Deciduous Forests of Eastern North America*, was published. With that book completed, she turned her prodigious energy to the new Ohio Flora Project.

The development of ideas about the project, the goals and methods that gradually took shape, and the problems encountered, emerge from reports written by Braun and Herrick.

Braun et al. (1952) wrote, "Because of the tremendous size of the project before us, we shall start by selecting certain units of the flora, completing these in turn, and finally assembling the whole. . . . The first unit will be "Trees and Shrubs of Ohio"—to include all native and naturalized woody plants of Ohio (approximately 300 species)."

The first task was to locate and identify the herbarium collections within the state. Herrick et al. (1955) wrote, "... plans [for the project] were announced at the Academy meetings at Miami in April, 1951. The response of Ohio botanists was splendid. Questionnaires distributed at that time led to the location of many thousands of herbarium specimens available for study. Each year, as the project becomes better known, much has been added to the known herbarium resources. Even as late as April 1954, (Athens meeting of the Academy) two significant plant collections were [first] made known and [made] available to the committee."

Once collections were located, their curators or owners were asked to report data on a standardized form. Herrick et al. (1955) stated: "In order to assemble information and to facilitate further study of actual specimens we are asking for an herbarium slip (a printed form provided by the committee) for each specimen. Many thousands of such slips have already come in; more come in each month." (These slips are now on file in The Ohio State University Herbarium.)

According to Braun et al. (1956), "General procedure is to collect records of known herbarium specimens of Ohio plants. From these records, mimeographed preliminary lists are being prepared in which distribution by counties is reported. (It should be noted that most of these records must still be verified.) On the basis of these preliminary lists such specimens as are needed to fill in the gaps are being collected."

No one was more assiduous at "filling the gaps" in county records than Herrick's brother, Ervin M. Herrick. As Braun assembled data on the woody plants, Ervin Herrick traveled the highways and byways of the state searching for specimens on a county-by-county basis. For example, specimens at The Ohio State University Herbarium show that for *Fraxinus americana* L., white ash, Ervin Herrick made his first collection in July 1953, from Medina

Co., and then collections in June 1954, from Mahoning and Pickaway Co.; in July 1954, from Athens, Columbiana, Muskingum, Perry, and Washington Co.; in October 1954, from Delaware, Morrow, and Richland Co.; in June 1955, from Lawrence Co.; in July 1955, from Crawford, Marion, Sandusky, and Wyandot Co.; in June 1956, from Portage Co.; in July 1956, from Scioto and Monroe Co.; in August 1956, from Defiance, Henry, and Van Wert Co.; in September 1956, from Lucas, Putnam, and Wood Co.; in June 1957, from Brown Co.; in July 1957 (his peak month) from Clark, Clermont, Clinton, Fayette, Greene, Hamilton, Highland, Madison, and Warren Co.; and in a final surge in August 1958, from Auglaize, Butler, Champaign, Darke, Logan, Preble, Seneca, and Shelby Co. Most of these were at that time new county records. It was as if Braun had given him a county shopping list, as indeed she probably had, and he had gone forth to fill the gaps. In support of Braun's work, Ervin Herrick made similar intensive county-by-county collections of many other woody plant species.

To the curator of The Ohio State University Herbarium, Clara G. Weishaupt, fell the task of processing this great influx of new voucher specimens. In addition, Weishaupt did a considerable amount of gap-filling on her own.

An undated and previously unpublished memorandum issued by Braun, written probably in 1956, outlined the matured plans for the Ohio Flora. It is printed here in its entirety. The only major change in these plans was the subsequent decision to include illustrations of most native species.

SUGGESTIONS FOR COLLABORATORS

NOMENCLATURE

The nomenclature of the 8th edition of Gray's Manual of Botany (Fernald, 1950) will be used, with certain exceptions:

- a. Designation of varieties; the specific name applies to the taxon as a whole; the typical variety must be named (by

repetition of the species name) if varieties are distinguished. (See Gleason, 1952, [Vol. 1] Introduction, pp. XXIV, XXV.)

- b. Recent work, which may necessitate departure from the 1950 Manual.
- c. Other interpretations more applicable to Ohio plants of certain genera or species.

SYNONYMS

Synonyms will be given, if name used differs from that in ed. 7 (or 8), in B. & B. [Gleason, 1952], or in Schaffner (1932).

KEYS

Very full keys, which include many characters. If possible, construct keys so that plants can be identified at more than one season.

COMMON NAMES

If there is a well-established local name, it should be given. Incorrect or misleading common names should be omitted. See Little, 1953, pp. 14-16 (especially #4), in Check List of Native and Naturalized Trees of the United States (in U.S.D.A.-Forest Service-Agr. Handbook no. 41) for use of hyphens. Example: sweet-fern is not a fern therefore use hyphen; blue-beech is not a beech, therefore hyphen.

TEXT

Informative; not usually necessary to repeat characters in keys. Habitats should be given.

PRELIMINARY MAPS OF DISTRIBUTION

While working, it is well to make maps (a dot in each county in which the species occurs) as these suggest correlations with physical factors. They may show gaps which should be filled by collecting.

CORRELATIONS

Where correlations can be made between distribution and physical features of Ohio, past migrations, etc., these should be pointed out. During the winter of 1956-57, maps of certain physical features will be prepared and will be made available.

RANGES

Generic and sometimes family range may be of interest. Range of species—outside of Ohio—will be given in terms of natural areas when possible.

E. LUCY BRAUN

The first phase of the project came to a close with the publication by Ohio State University Press of *Woody Plants of Ohio* (Braun 1961). It was a classic treatment of

a state's woody plant life and received wide acclaim. It contained county dot distribution maps for 333 species, 65 of them members of the genus *Crataegus* in a special segment of the text contributed by Ernest J. Palmer. An outstanding feature of the book was an excellent introductory section entitled, "Vegetation of Ohio, and correlation with environment," with an explanatory set of state maps. For a list of reviews of the book, see Stuckey (1973).

THE PERIOD FROM 1959 TO THE PRESENT

In 1959, T. Richard Fisher, then of The Ohio State University, was named chairman of the Ohio Flora Committee to succeed Braun who had resigned that position. Fisher was instrumental in effecting an agreement between The Ohio Academy of Science and the Ohio State University Press signed on 20 January 1966. It read, in part: "The Academy and the Press agree that the *Flora* shall consist of four volumes, the subject matter of which shall be (1) the Monocots, (2) the Dicots through Rosales [i.e., Saururaceae through Leguminosae], (3) the Dicots through Campanulaceae [i.e., Linaceae through Campanulaceae], and (4) the Dicots through Compositae [i.e., the Compositae]."

In 1967, the first of these volumes, Braun's *The Monocotyledoneae* (Braun 1967) appeared. It included text and distribution maps for 558 species. The large section on the family Gramineae, covering 159 of those species, was contributed by Clara G. Weishaupt, who had joined the Ohio Flora Committee shortly after its inception.

The number of herbarium specimens available for the study of monocots was considerably greater than the number examined for the book on woody plants, and Braun (1967) noted, "Time-limits in completing this work did not permit examining all specimens reported . . . but in so far as possible, all reported specimens that would have added a county record (a dot on the map) were borrowed and ex-

amined." For a list of reviews of the book, see Stuckey (1973).

In 1969, I succeeded Fisher as chairman of the committee. Arranging for completion of the work on the 1900 species of dicots in the Ohio flora presented a larger task and a unique challenge, lacking personnel who could devote amounts of time to the project comparable to those given by Braun. Early on, Braun et al. (1956) had written, "As is feasible, published papers dealing with portions of the Ohio Flora will appear." This was the approach that evolved with the dicots. Braun, herself, led the way with a publication (Braun 1960) on the genus *Tilia* in Ohio. This was followed by her major study (Braun 1961) that covered all the woody species of dicots.

Since 1961, many papers have appeared providing county distribution maps and other floristic data for the species of individual dicot families. The first was Cruden's (1962) paper on the Campanulaceae, completed while he was a graduate student at The Ohio State University.

From Kent State University, students working under my direction have published studies on the Dipsacaceae and Valerianaceae (Hauser 1963), Rubiaceae (Hauser 1964), Caprifoliaceae (Hauser 1965), Orobanchaceae (Valley and Cooperrider 1966), Scrophulariaceae (McCready and Cooperrider 1978, Bentz and Cooperrider 1978), Apocynaceae (Andreas and Cooperrider 1979), Asclepiadaceae (Andreas and Cooperrider 1980), Gentianaceae and Menyanthaceae (Andreas and Cooperrider 1981), and Primulaceae (Brockett and Cooperrider 1983). A study on the Geraniaceae (McCready and Cooperrider 1984) was recently completed.

From Bowling Green State University, a study of the family Cruciferae was published (Easterly 1964).

Blackwell (1970) from Miami University, published a study of the Lythraceae. Students working under his direction have prepared papers on the Cactaceae (Noelle and Blackwell 1972), Araliaceae (Kerrigan

and Blackwell 1973), Cistaceae (O'Connor and Blackwell 1974), Chenopodiaceae (Arbak and Blackwell 1982), and Berberidaceae (Loconte and Blackwell 1984). Also from Miami University, Jacobs and Eshbaugh (1983) have published a study of the Solanaceae.

In addition, unpublished theses done at Ohio University under the direction of William G. Gambill, Jr. covered the Rosaceae (Gray 1962), Crassulaceae, Saxifragaceae, and Oxalidaceae (Wingo 1962), Papaveraceae, Fumariaceae, Capparaceae, Resedaceae, Sarraceniaceae, Droseraceae, and Podostemaceae (Althaus 1967), and Euphorbiaceae (Wisniewski 1967). Unpublished theses and other research done under my direction at Kent State University covered the Labiatae (Sabo 1965), Acanthaceae, Bignoniaceae, Lentibulariaceae, Martyniaceae, and Phrymaceae (Dumke 1967), Hydrophyllaceae and Verbenaceae (Dumke 1968), and Violaceae (Miller 1976).

Several studies with county distribution maps have been prepared for individual dicot genera and species: *Aesculus* (Beatley 1979), *Aster* (Speer 1962), *Carduus nutans* (Stuckey and Forsyth 1971), *Phoradendron serotinum* (Spooner 1983), *Rhamnus frangula* (Howell and Blackwell 1977), *Silene regia* (King 1981), *Silphium* (Fisher 1966), and *Spergularia* (Cusick 1983).

Although as originally designed, the Ohio Flora Project was intended to cover all vascular plants, only the angiosperms were provided for in the contract with Ohio State University Press. For the other two groups of vascular plants, Braun (1961) treated the gymnosperms in *The Woody Plants of Ohio*, and Adams (1982) listed county-by-county distribution for rare pteridophyte species and hybrids.

Working on the Ohio Flora Project from another approach, more than 50 individual plant surveys in various parts of the state have been made since 1950. These have ranged in size from surveys of a small area such as a home farm, a scout or church camp, or a nature preserve to surveys of

individual counties or groups of counties (e.g. Andreas 1980), groups of areas of a particular habitat type (e.g. Anderson 1971), or large physiographic sections of the state (e.g. Cusick and Silberhorn 1977). Some of these efforts have been labors of love motivated by personal interest in a particular site, others part of an academic research program. In all, they have produced since 1950, ca. 150,000 systematically selected specimens, bringing to more than 300,000 the number of Ohio vascular plant specimens now housed in Ohio herbaria.

The actuation of the Ohio Flora Project in 1950 has stimulated a great amount of floristic research, both in the herbarium and in the field, during the past 34 years. The concept of the project has provided a framework for numerous theses, dissertations, and individual studies. It has given the massive amount of Ohio floristic work an intellectual underpinning. The scope of this effort and the number of professional botanists involved is, to my knowledge, without equal in any of the other 49 states.

EFFORTS TO IDENTIFY ENDANGERED SPECIES

The need for protecting endangered plant species was one of many concerns spawned by the environmental movement of the 1960s and early 1970s. In Ohio, a salutary side effect of the great amount of recent floristic research was a solid data base from which to begin a program for identifying and conserving endangered species of plants.

In 1973, Charles C. King, executive director of the Ohio Biological Survey (OBS), called a meeting of professionals concerned with the problem. The result was the formation of the OBS "Endangered Species and Populations Committee." From this OBS effort, a book on Ohio's endangered plants (Cooperrider 1982) has been published, and a second on the endangered animals is planned. For reviews

of the endangered plants study, see Mohlenbrock (1983) and Voss (1984).

In 1976, a related effort was initiated by the formation of the Ohio Natural Heritage Program, now a part of the Ohio Department of Natural Resources (ODNR), but at its inception jointly sponsored by the ODNR and The Nature Conservancy. One goal of the Natural Heritage Program has been to identify those Ohio sites worthy of conservation because of the rare plants they harbor. The year 1978 saw the passage of Ohio's first law to protect endangered plants. The implementation of the statute was assigned to the ODNR's Division of Natural Areas and Preserves. That division includes the Heritage Program, whose staff was given the task of preparing a list of "plants native to Ohio which are in danger of extirpation or which are threatened with becoming endangered." The first such list was published in 1980, revised lists in 1982 and 1984. In association with preparing the lists, members of the Heritage Program staff have conducted field surveys, yielding valuable herbarium specimens, which have further improved knowledge of the Ohio flora.

The existence of the two complementary endeavors focusing on endangered plant species, that of the OBS and that of the ODNR, has proved of great value, integrating the work of Ohio's academic community with that of a state agency bearing a legal mandate. Stuckey (1982) presents a detailed account of both programs.

PRESENT STATUS OF THE PROJECT

The great amount of floristic work done in the state since 1950, the vastly increased number of Ohio herbarium specimens, and the revisionary work done in the taxonomic community at large since the publication of Fernald's 8th edition of *Gray's Manual of Botany*, all offer the possibility of a treatment of Ohio's dicots of far greater scope and detail than would have been thought possible in 1950. Each of these elements carries with it a commensurate increase in

the amount of time required for completion of the work. A part of the increased workload will be offset by the studies of individual taxa cited earlier and by a number of similar studies now in progress.

Of the three dicot volumes, two are in preparation; the third at this writing has yet to be started. T. Richard Fisher's manuscript for the final volume of the series, that covering some 300 species of the family Compositae, has been completed and is now in revision. My work, on the next-to-last volume, covering some 800 species in the families Linaceae through Campanulaceae, is 50% complete. During the 1979-81 biennium and again during 1983-85, special appropriations from the State of Ohio have supported work on the project. It was these funds that moved the two volumes forward.

In this regard, and writing on behalf of the Ohio Flora Committee, I thank those members of the Ohio State Legislature who supported this effort. I thank also Charles C. King, executive director of The Ohio Biological Survey, who lent strong assistance to the effort, and Richard E. Moseley, Jr., chief, Division of Natural Areas and Preserves, who has administered the program for The Ohio Department of Natural Resources. I take this unique opportunity also to thank The Ohio Academy of Science, especially the late John H. Melvin, former executive officer of the academy, and Lynn Edward Elfner, present executive officer, for their support. Finally, I acknowledge with gratitude the support of David H. Stansbery of The Ohio State University, and Jane L. Forsyth of Bowling Green State University, both former editors of *The Ohio Journal of Science*, and Earl L. Core and Jesse F. Clovis of West Virginia University, former editors of *Castanea*, and the present editorial staffs of those journals, all of whom have fostered the publication of the individual studies listed earlier. Because of the prospect of publication, much research on the project was undertaken and completed that otherwise might not have been initiated.

CONCLUSION

Braun observed (1967, p. 3), "A study of herbarium specimens of a species of plant is, in a sense, a study of individuals that make up the species-population in the area under consideration. It discloses variations apparently related to unlike conditions in different parts of the geographic range [or it may, for example] show that varieties of a species which are fairly distinct in one part of its range are intergrading in another." It is because they enable us to see patterns of variation that we could not otherwise observe, and because they provide vouchers documenting a species' existence at a particular place and a particular time that herbarium specimens are an invaluable contribution to scientific knowledge and an essential element in the preparation of a state flora.

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